4.4 ENERGY

This section provides an evaluation of existing energy production/consumption conditions, as well as potential energy use and related impacts from the proposed project. The following discussion is based in part on the State CEQA Guidelines Appendix F, Energy Conservation (2010); the *Air Quality and Climate Change Technical Report* prepared by HELIX in August 2012 (2012a; Draft EIR Appendix B); SANDAG's *Energy 2030: San Diego Regional Energy Strategy* (SANDAG 2003); the *California Energy Demand 2010-2020 Adopted Forecast* (California Energy Commission [CEC] 2009a)*;* the CEC's 2009 Integrated Energy Policy Report (CEC 2009b); and the CEC's 2010 Integrated Energy Policy Report Update (CEC 2011a).

Units of Measure

The units of energy used in this report are the British thermal unit (BTU), kilowatt hours (kWh), therms, and gallons. A BTU is the quantity of heat required to raise the temperature of 1 pound of water 1° F at sea level. Because the other units of energy can all be converted into equivalent BTUs, the BTU is used as the basis for comparing energy consumption associated with different resources. A kWh is a unit of electrical energy, and 1 kWh is equivalent to approximately 10,200 BTUs, taking into account initial conversion losses (i.e., from one type of energy, such as chemical, to another type of energy, such as mechanical) and transmission losses. Natural gas consumption is described typically in terms of cubic feet or therms; 1 cubic foot of natural gas is equivalent to approximately 1,050 BTUs, and 1 therm represents 100,000 BTUs. One gallon of gasoline/diesel is equivalent to approximately 125,000/139,000 BTUs, respectively, taking into account energy consumed in the refining process.

4.4.1 Environmental Setting

State Energy Conditions

California's electricity needs are satisfied by a variety of entities, including investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators[1]. As of 2008, in-state generating facilities accounted for about 73 percent of the total electric power produced in California, with the remaining electricity coming from out-of-state imports. In-state generation also accounted for approximately 13 percent of the state's natural gas supply,

[1] Community choice aggregation is authorized in California by AB 117 (Chapter 836, Statutes of 2002), which allows cities, counties, and groups of cities and counties to aggregate the electric load of the residents, businesses, and institutions within their jurisdictions to provide them electricity.

and approximately 38 percent of and the state's crude oil supply. The remaining energy supply comes from other western states and Canada (CEC 2009b). Table 4.4-1, *California Energy Sources 2008*, provides a summary of California's energy sources as of 2008.

Table 4.4-1
CALIFORNIA ENERGY SOURCES 2008

Fuel Type	Percent of California Power
Natural Gas	46.50
Nuclear	14.90
Large Hydro	9.60
Coal	15.50
Renewable	13.50
Total	**100.00**

Source: CEC 2009b

Since deregulation in 1998, the CEC has licensed or given small power plant exemptions to 91 power plants, including:

- 48 projects representing 16,635 megawatts (MW) currently on-line.
- 26 projects totaling 10,379.5 MW currently under construction or pre-construction.
- 5 projects totaling 3,139 MW currently on hold but available for construction.
- 12 projects totaling 5,605 MW approved but then cancelled by applicants.

In addition, as of August 2011, the CEC has a total of 11 proposed projects under review, totaling approximately 3,043 MW (CEC 2011c). One of the projects in active review is a large-scale solar thermal power plant. Two of these projects representing 906 MW have been suspended while in review.

On the demand side, Californians consumed 285,574 gigawatt hours (gWh) of electricity in 2008, primarily in the commercial, residential, and industrial sectors. CEC staff forecasts of future electricity demand anticipate that consumption will grow by 1.2 percent per year from 2010 to 2018, with peak demand growing an average of 1.3 percent annually over the same period. The American Recovery and Reinvestment Act of 2009 (ARRA) was signed on February 13, 2009, providing $787 billion nationwide to create new jobs, jump-start the economy, and invest in long-term growth. To date, California has been awarded approximately $5 billion of this economic stimulus funding for energy-related projects. Because of ARRA's expected impact on the state's economic, energy, and environmental sectors, the 2010 Integrated

Energy Policy Report (2010 IEPR Update, CEC 2011a) focuses on the benefits of ARRA funding administered or leveraged by the CEC, how funded projects meet the ARRA goals for creating jobs and stimulating the economy, and how funding will advance California's energy and environmental goals. ARRA funding will contribute to California's energy policy goals of achieving cost-effective energy efficiency in existing buildings, meeting a 33 percent renewable energy target, and reducing the state's dependence on petroleum fuels, in addition to creating jobs needed to meet these policy goals.

San Diego Regional Energy Conditions

Energy Generation and Consumption

The San Diego Regional Energy Office's (SDREO) 2003 *San Diego Regional Energy Infrastructure Study* (SDREIS) provided an integrated and comprehensive analysis of the electricity and natural gas supply and demand inventory and issues (SDREO 2003). The SDREIS found that the San Diego region is unique compared to the rest of the state because of its proximity to Baja California, Mexico and the close integration with respect to trade flows, movement of people, and capital. Currently, there is a growing interdependency between San Diego County and Northern Baja California in terms of both the supply and demand of energy. Electric power transfers have taken place between California and Northern Baja California, to some extent, for more than 20 years and recently, the bi-national supply and demand interdependencies have increased dramatically. Additionally, while abundant renewable resources are located within the County, the available resources are much greater when the potential of surrounding counties and Baja California are considered. The San Diego region's economic and energy development future depends on bi-national as well as interregional cooperation and joint problem solving. San Diego County experiences many unique challenges because of its "island-like" geographic situation, bounded by the Pacific Ocean to the west, the Laguna Mountains to the east, the Mexican border to the south and Camp Pendleton to the north. Because of this fact, there are significant supply issues and risks that the region is facing unless additional supply options are made available.

SANDAG's 2009 Regional Energy Strategy (RES) (SANDAG 2009a) identifies priority early implementation actions, essential to meeting the region's energy goals:

1. Pursue a comprehensive building retrofit program to improve efficiency and install renewable energy systems;
2. Create financing programs to pay for projects and improvements that save energy;

3. Utilize SANDAG-SDG&E Local Government Partnership to help local governments identify opportunities and implement energy savings at government facilities and throughout their communities;
4. Support land use and transportation planning strategies that reduce energy use and greenhouse gas emissions;
5. Support planning of electric charging and alternative fueling infrastructure; and
6. Support use of existing unused reclaimed water to decrease the amount of energy needed to meet the water needs of the San Diego region.

The RES identified the main drivers of the strategy, including the state's preferred loading order for meeting new energy needs and global climate change and its policy implications. The California Public Utilities Commission (CPUC) and CEC adopted a preferred loading order to meet the goals for satisfying the state's growing demand for electricity, which would place top priority on increasing energy efficiency and demand response (i.e., temporary reduction or shift in energy use during peak hours), generating new energy from renewable and distributed generation resources, and improvements to clean fossil-fueled generation and infrastructure. Environmental changes caused by climate change are anticipated to have an increasing impact on energy production and peak demand for electricity. Global climate change is discussed in detail in Section 4.6, *Greenhouse Gas Emissions*, of this EIR.

Electricity

San Diego County has two major steam electric generating units and a number of smaller combustion turbine units, most of which were constructed between 1960 and 1978. Although these units have continued operation with modifications and upgrades, they are quickly nearing technological and economical obsolescence. Reliability must-run units are generation facilities that are necessary during certain operating conditions in order to maintain the security of power systems in a competitive environment. A number of the units that are currently considered "must-run" to meet the region's energy needs have been operating in the three percent capacity range, but need to be operating in the five percent capacity range. Must-run units are more expensive to operate and are only used as operating reserves during peak periods or in times of emergency backup. This is because the outage costs are much higher than the power generating cost (SDREO 2003).

As of 2003 when the SDREIS was completed, San Diego had a total on-system generation capacity of about 2,359 MWs, which was about 55 percent of the region's summer peak demand. This capacity consists of 1,628-MW base-load plants. Base-load plants are the production

facilities used to meet some or all of a given region's continuous energy demand, and produce energy at a constant rate, usually at a low cost relative to other production facilities available to the system. The remaining capacities are small and medium-sized peaking plants and on-site generators (excluding backup generation). All of this generation is not normally available since many of the generators are for emergency use and not available when needed. During peak demand periods, approximately 64 percent of peak demand can be met by in-county electrical generation.

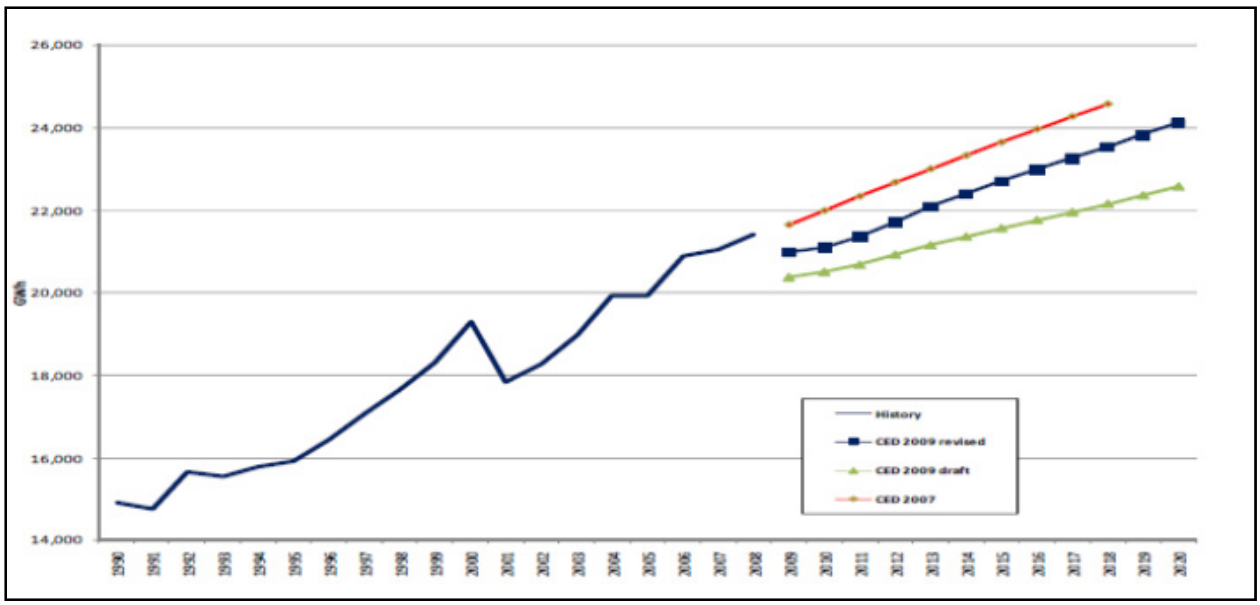
As shown in Table 4.4-2, *San Diego County Electricity Consumption 2006 – 2010*, the CEC found that electricity consumption within the County of San Diego increased approximately 2.4 percent from 2006 to 2008 (CEC 2011a), but decreased approximately 5.7 percent from 2008 to 2010.

Table 4.4-2
SAN DIEGO COUNTY ELECTRICITY CONSUMPTION 2006 – 2010
(in millions of kWh)

Year	2006	2007	2008	2009	2010	Total Usage
Usage	19,435.01	19,568.84	19,907.89	19,426.78	18,800.70	97,139.21
% Change (Annual)	--	0.68	1.7	-2.5	-3.2	-3.32

Notes: kWh = kilowatt hours
Source: CEC 2011a

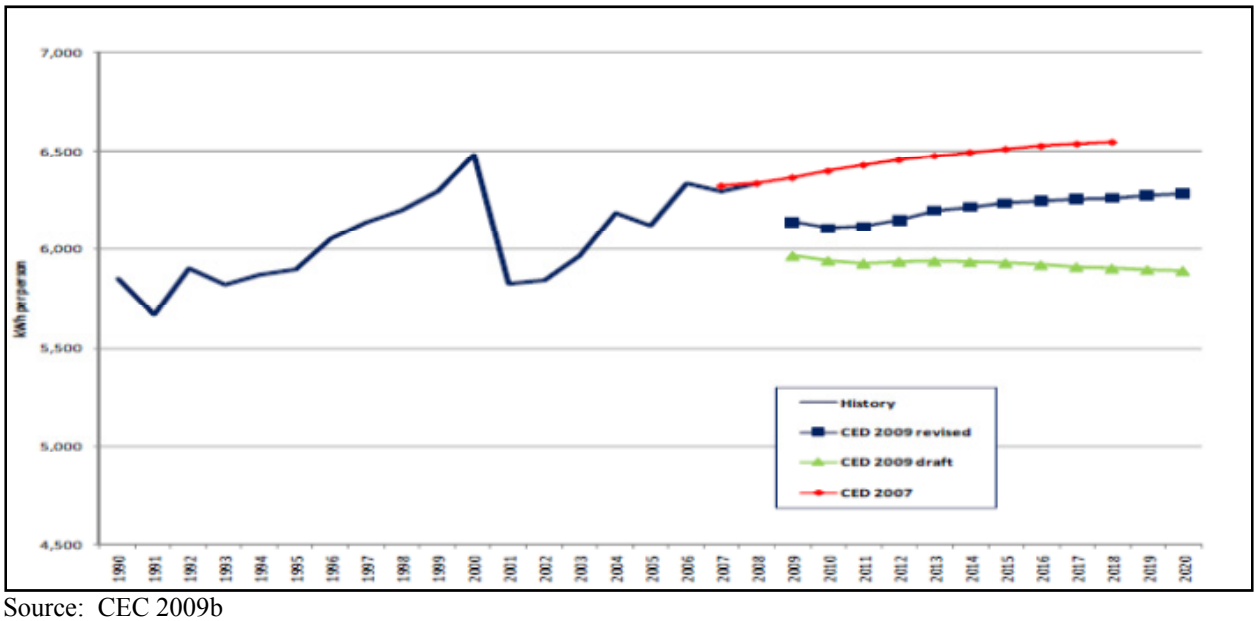
The primary provider of electricity and natural gas in the San Diego region is San Diego Gas and Electric (SDG&E). Figure 4.4-1, *SDG&E Electricity Forecast*, shows the SDG&E planning area's anticipated electricity forecast through the year 2020. As shown in Figure 4.4-1, the California Energy Demand (CED) 2009 adopted forecasted consumption (labeled as CED 2009 revised) is lower than the forecasted consumption from the 2007 CED, which reflects the current recession and increased savings from energy efficiency programs. The CED 2009 adopted forecast estimates that annual electricity consumption for the County would reach approximately 24,000 kWh by 2020.



Source: CEC 2009b

SDG&E ELECTRICITY FORECAST
Figure 4.4-1

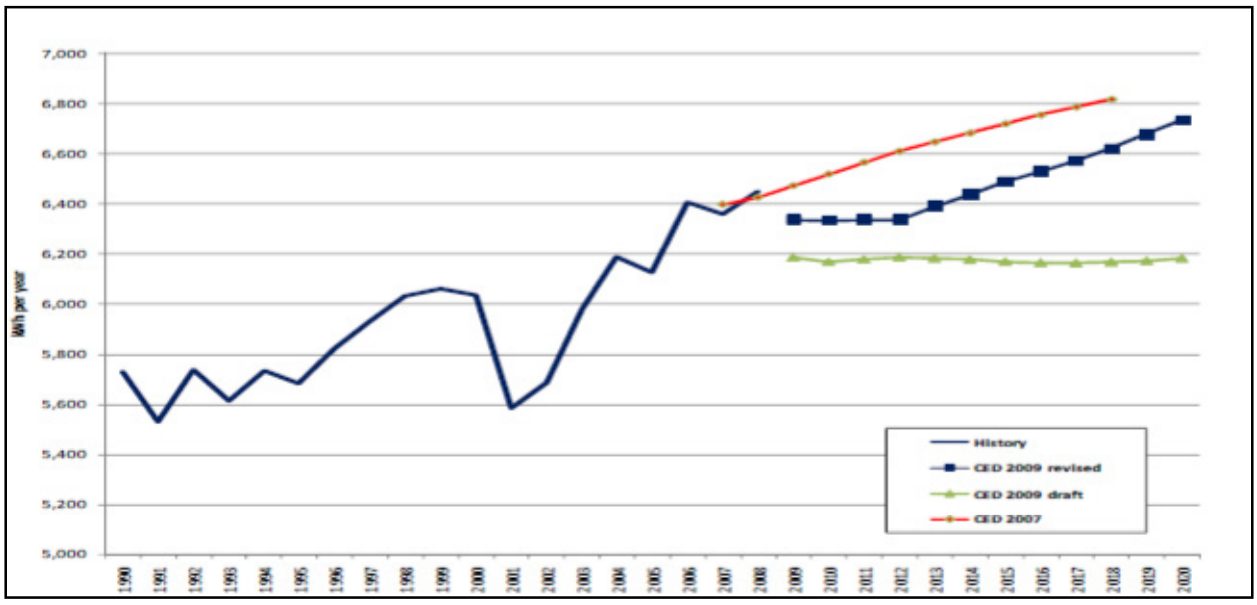
Figure 4.4-2, *SDG&E Per Capita Electricity Consumption*, illustrates the per-capita electricity consumption projections within the SDG&E planning area through 2020. Projections are shown to increase slightly after 2012 as a result of consumption from electric vehicles. The current recession and increased savings from conservation and energy efficiency programs combine to cause a short-term dip in per capita consumption, as shown in the CED 2009 adopted projection. By 2020, per capita electricity consumption is projected to be approximately 6,300 kWh per person.



Source: CEC 2009b

SDG&E PER CAPITA ELECTRICITY CONSUMPTION
Figure 4.4-2

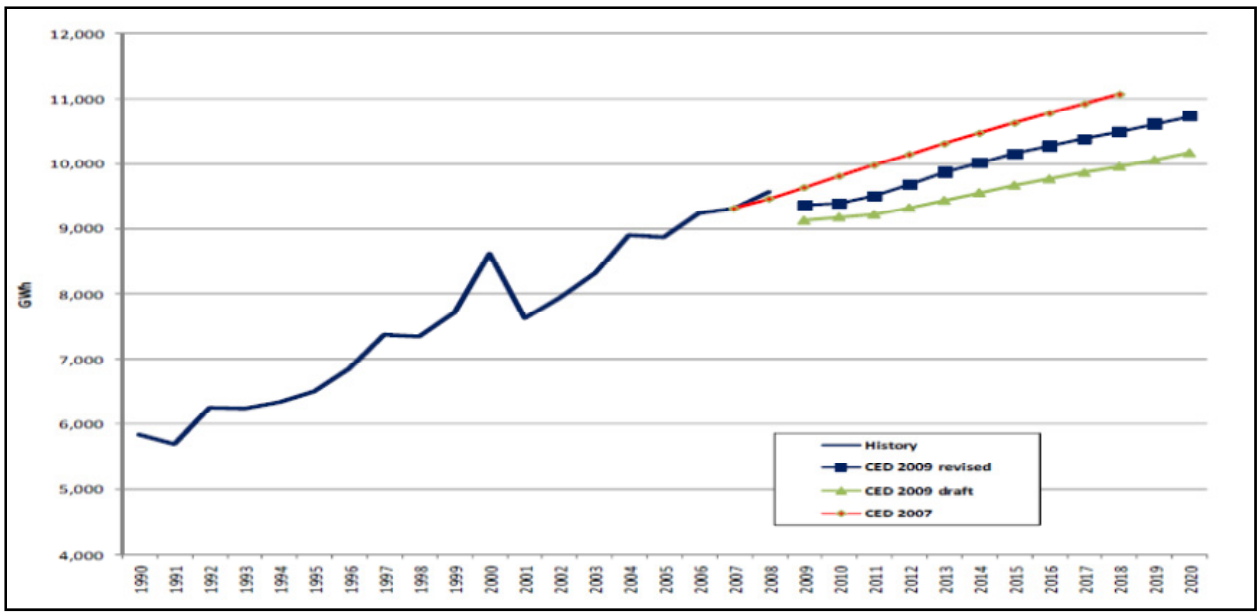
Residential and commercial sectors use the most electricity in the San Diego region, and consumption is projected to increase with regional population and job growth (SANDAG 2009a). Figure 4.4-3, *SDG&E Electricity Consumption Per Household*, shows the 2020 forecast energy consumption within the SDG&E planning area for residential uses. As shown in Figure 4.4-3, the CED 2009 adopted projections increase slightly over the forecast period as a result of increased household income projections and electric vehicle consumption in the residential sector (which accounts for approximately 70 percent of the increase in use per household from 2012 to 2020). By 2020, electricity consumption per household is expected to reach 6,700 kWh per year.



Source: CEC 2009a

SDG&E ELECTRICITY CONSUMPTION PER HOUSEHOLD
Figure 4.4-3

Figure 4.4-4, *SDG&E Electricity Consumption for Commercial Uses*, shows the 2020 forecast energy consumption within the SDG&E planning area for commercial uses. As shown in Figure 4.4-4, 2020 commercial electricity consumption rates are anticipated to range between 10,000 and 11,000 GWh per SF based on the CED 2009 adopted forecast.



Source: CEC 2009a

SDG&E ELECTRICITY CONSUMPTION FOR COMMERCIAL USES
Figure 4.4-4

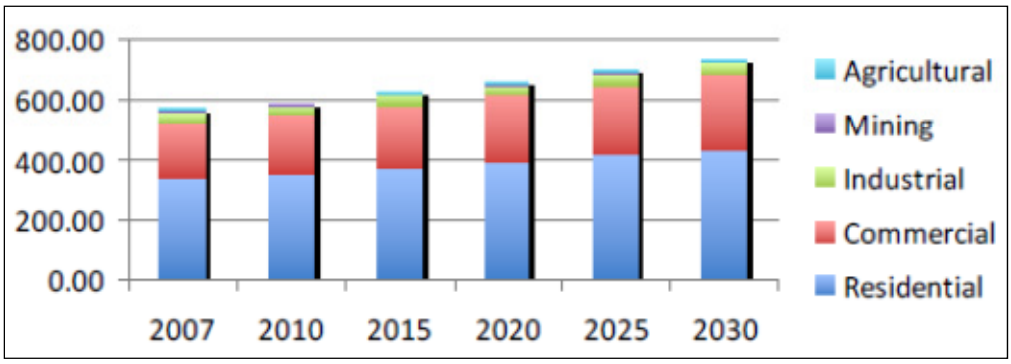
Future electricity supply may be affected by SDG&E's proposed 120-mile high-voltage transmission line, known as the Sunrise Powerlink, to carry renewable energy from the Imperial Valley to San Diego. Construction for the project began in September 2010, with completion scheduled for 2012. It is planned to have a 1,000-megawatt capacity (enough energy for 650,000 homes).

Natural Gas

In 2008, natural gas accounted for more than 45 percent of California's total system needs, approximately 140,215 gWh (CEC 2009b). Several major generating plants were recently implemented in San Diego County, including the 90-MW Larkspur Energy Facility in Chula Vista in 2001; the 550-MW Palomar Power Plant in Escondido in 2006; and the 513-MW Otay Mesa Center power plant near the U.S.-Mexico border in 2009. In addition, a proposal has been submitted to SDG&E to expand the existing 965-MW Encina Power Plant to at least 1,200 MW for use as a peaking or intermediate power plant.

As shown in Figure 4.4-5, *San Diego Regional Natural Gas Consumption Forecast*, the San Diego region currently consumes approximately 581 million therms (MMTh) of natural gas per year (not including gas used for electricity generation, as accounted for above). The majority of natural gas uses are for residential and commercial purposes. Currently, California imports

87 percent of natural gas needs from out of state, while in-state natural gas production is decreasing. Regional gas consumption is expected to increase to 660 MMTh in 2020 and 730 MMTh in 2030 under business as usual conditions, as shown in Figure 4.4-5.



Source: SANDAG 2009a

SAN DIEGO REGIONAL NATURAL GAS CONSUMPTION FORECAST
Figure 4.4-5

Varying demand for natural gas and volatile natural gas prices make reliably predicting future gas prices difficult. As shown in Table 4.4-3, *San Diego County Natural Gas Consumption 2006 – 2010*, the CEC found that natural gas consumption within the County of San Diego decreased approximately three percent from 2006 to 2010 (CEC 2011a). This discrepancy in projected rates versus actual rates may be a result of unexpected decreases in natural gas consumption associated with construction activity and income, which both experienced downturns between 2007 and 2009.

Table 4.4-3
SAN DIEGO COUNTY NATURAL GAS CONSUMPTION 2006 – 2010
(in MMTh)

Year	2006	2007	2008	2009	2010	Total Usage
Usage	574.25	547.03	541.37	514.88	560.78	2738.31
Percent Change (Annual)	--	-4.98	-1.05	-5.14	8.19	-2.98

Notes: MMTh = million therms
Source: CEC 2011a

Water-related Energy

In California, water-related energy use, which includes the conveyance, storage, treatment, distribution, wastewater collection, treatment, and discharge sectors of the water use cycle, consumes about 19 percent of the state's electricity, 30 percent of its natural gas, and 88 billion gallons of diesel fuel every year. Of this amount, more than 12,000 GWh (26 percent, about 5 percent of the state's total electricity requirements) was deemed attributable to energy used by water and wastewater systems and their operations. The balance of water-related energy was attributed to the amount of energy needed to apply and use water for agricultural, residential, commercial, and industrial purposes. Before it reaches arid San Diego, water is pumped hundreds of miles from either the Sacramento-San Joaquin Bay Delta in Northern California or from the Colorado River. It takes energy to move and treat water; this water-related energy use is termed "water embedded energy," since each time water is moved or treated using energy, that energy is considered to be embedded in that water or part of the value of that water (CEC 2007).

There are two distinctly different types of water impacts on the energy sector according to the California Public Utilities Commission (CPUC 2010):

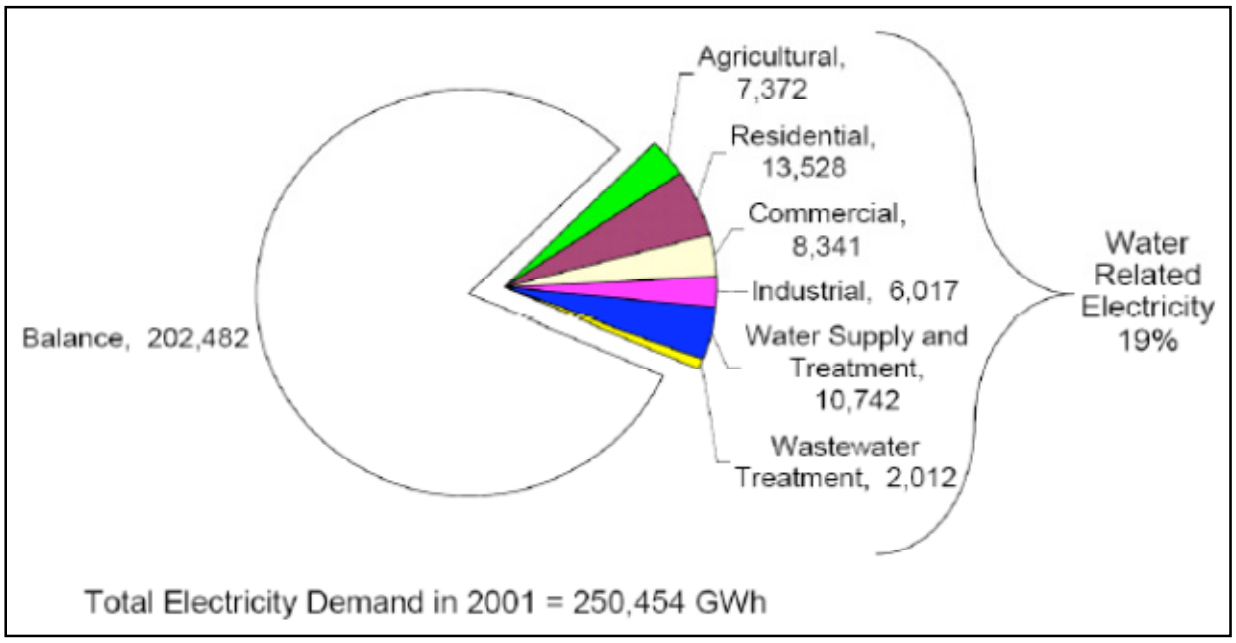
- Energy Use by the Water Sector − the amount, timing, and location of energy needed to support water sector operations.
- Energy Use by Water Customers − the amount of energy used by water customers during the consumption of water, whether for pumping, heating, or other purposes.

Water embedded energy refers to the amount of energy that is used to collect, convey, treat, and distribute a unit of water to end users, and the amount of energy that is used to collect and transport used water for treatment prior to safe discharge of the effluent in accordance with regulatory rules (CPUC 2010). As water demand grows in the state, so grows water-related energy demand. Because population growth drives demand for both resources, water and energy demand are growing at about the same rate and, importantly, in many of the same geographic areas (CEC 2007).

Water supply-related electrical demands exceed 2,000 MW on summer peak days in California. Agricultural groundwater and surface water pumping represent 60 percent of the total water supply-related peak day electrical demand, with water agency demands representing the remaining 40 percent. Over 500 MW of water agency electrical demand is used for providing water/sewer services to residential water customers. The State Water Project, used to convey

water from Northern California to Southern California, consumes approximately three percent of all the electricity consumed in the state (CEC 2006a).

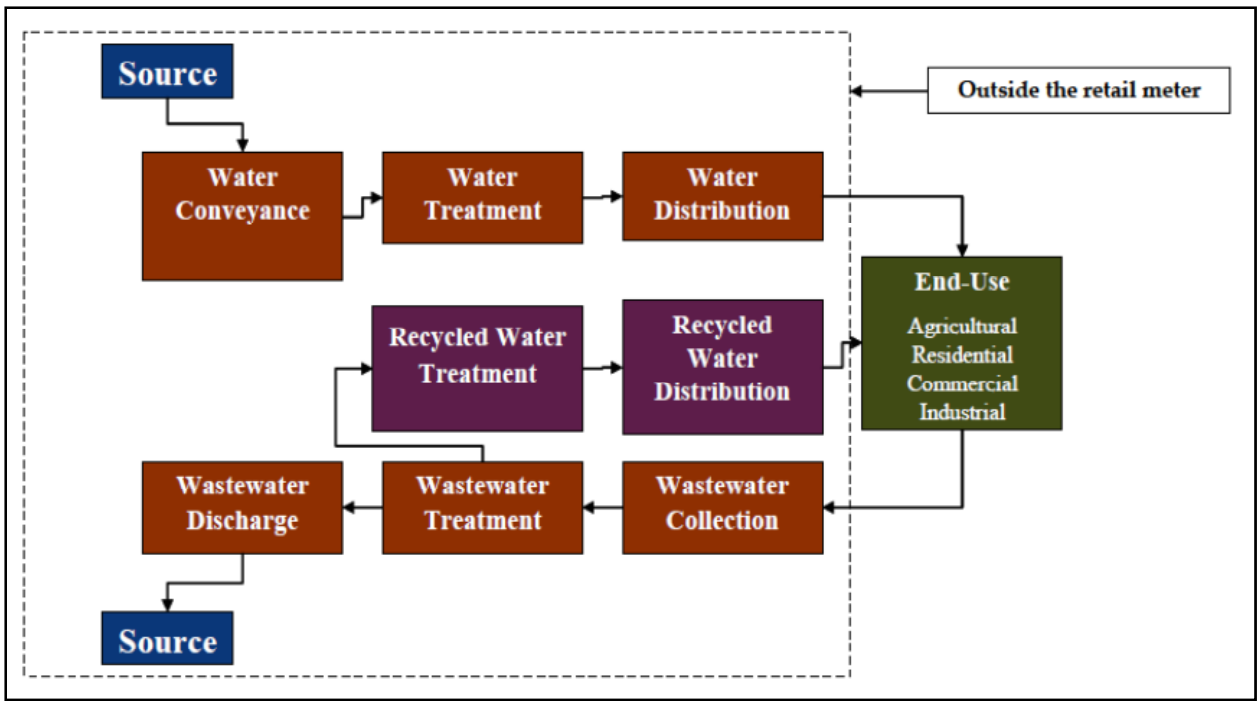
Figure 4.4-6, *Water-related Energy Use in California*, shows how and where power is used in the State's water systems (CEC 2007). Total water-related electrical consumption for the state of California amounts to approximately 52,000 gWh. Electricity to pump water by the water purveyors in the state amounts to 20,278 gWh. The remaining 32,000 gWh represent electricity used on the customer side of the meter, that is, electricity that customers use to move, heat, pressurize, filter, and cool water (CEC 2006a).



Source: CEC 2007

WATER-RELATED ENERGY USE IN CALIFORNIA
Figure 4.4-6

Figure 4.4-7, *Water Embedded Energy Sources*, illustrates the key segments of the water use cycle and conservative estimates of the amount of electricity used within each (CPUC 2010). Each unit of water may have a different amount of energy embedded in it depending on how much it is processed or conveyed before it is delivered to the user. This energy is quite different in northern California compared to southern California, because it depends on pumping requirements related to distance and topography. Treatment and distribution before end use is better defined and fairly consistent across California (CEC 2007).



Source: CEC 2006a

WATER EMBEDDED ENERGY SOURCES
Figure 4.4-7

The CEC's *Water Supply Related Electricity Demand in California* study (CEC 2006a) examined electrical demand necessary to treat water and get it to the customer, to take the wastewater from the customer and dispose of it, and to provide groundwater pumping and surface water pumping for the agricultural community. The study examined the water supply-related peak day demands of the California investor-owned utilities (IOUs): Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and SDG&E.

Within the SDG&E study area, within which the proposed project is located, the predominant water-related demand is for urban water supply. Approximately 20 percent of water supply-related electricity use is due to agricultural pumping, with the remaining 80 percent being provided by the water/sewer agencies. Table 4.4-4, *SDG&E Peak Day Water-related Demand Characteristics 2005*, shows SDG&E's 2005 peak water-related demand characteristics.

Table 4.4-4
SDG&E PEAK DAY WATER-RELATED DEMAND CHARACTERISTICS 2005

	Water/Sewer Agency	Total Water Demand
Peak Period		
average MW	26.2	32.9
maximum MW	32.5	40
4pm MW	24.2	30.3
Coincidence with ISO Peak	0.92	0.93
Mid-Peak Period		
average MW	31.4	37.8
maximum MW	35.5	43.2
Off-Peak Period		
average MW	28.3	33.1
maximum MW	31	35.6
TOU Accounts as % of Total Demand	28%	--

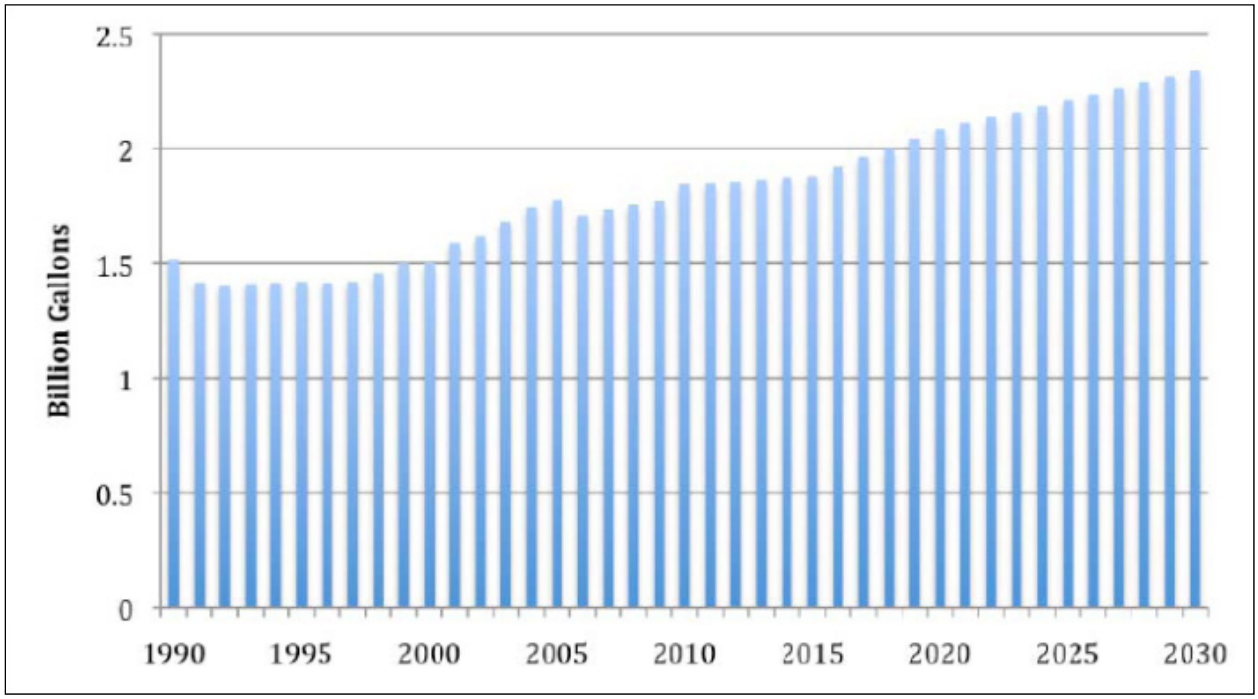
Source: CEC 2006a
ISO = Independent System Operator
TOU = Time-of-Use rate

SDG&E has the lowest embedded residential peak water supply-related electrical demand of any of the utility service areas. The San Diego area is at the end of the pipeline. Almost all of its water is treated somewhere else (generally in the SCE service area at the big MWD treatment plants) and shipped to the San Diego area. Residential water demand in the San Diego area results in electrical-demand increases in the SCE area for treatment and shipping. However, collaboration between SDG&E and the region's water agencies has resulted in most of the treatment (fresh water and sewer) facilities in this area having their own self-generation, dramatically reducing electrical demand by the water sector as the treatment facilities produce most of their own electricity (CEC 2006a).

Transportation

On-road transportation is a large consumer of energy, and is almost entirely dependent on petroleum-based fuels (gasoline and diesel). As shown in Figure 4.4-8, *San Diego Regional Projected On-road Fuel Consumption 1990-2030*, passenger cars and light-duty trucks are by far the largest consumers of transportation fuel, accounting for approximately 1.6 billion gallons of gasoline and diesel fuel per year (85 percent total consumption by on-road vehicles;

SANDAG 2009). Without changes in policy or behavior, on-road consumption of petroleum-based fuels is expected to increase considerably by 2020 and through 2030.



Source: SANDAG 2009a

SAN DIEGO REGIONAL PROJECTED ON-ROAD FUEL CONSUMPTION 1990 – 2030
Figure 4.4-8

Energy Efficiency Potential

Infrastructure Development

Several challenges exist to siting major energy infrastructure projects in San Diego. In addition, there is a lack of suitable sites away from populous areas and near transmission lines. Power plants, particularly coastal plants that restrict public access to coastal areas, are not perceived as ideal neighbors. Additionally, the transmission and distribution infrastructure required to support power plants create aesthetic, health, and quality of life concerns with residents in the local community. Lastly, siting is more problematic for water-cooled plants than dry-cooled due to the effects of power plant cooling systems on the ecosystem (SANDAG 2003).

In addition, the SDAB (which encompasses San Diego County) is currently classified as a nonattainment area for ozone (O_3) and particulate matter (PM_{10} and $PM_{2.5}$) (refer to Section 4.2, *Air Quality*). This means that all new major emission sources of ozone and particulate matter

must be mitigated through the purchase of offsets (credits for reduction of emissions) from other sources within the County. The SDAPCD requires emission offsets, and limited availability of emission reduction credits is a barrier to the building of new power plants. Several strategies could be used to create the needed emissions credits. These include repowering existing power plants, allowing mobile offsets to be used for stationary power plants, and creating inter-border pollution offsets.

Energy Demand Reductions

Estimates vary on what level of future energy reductions will be attributed to efficiency programs and standards over the next decade, depending on the assumptions used. The CPUC estimates that in the San Diego region, efficiency programs will achieve gross savings of 1,514 gWh and 52 MM Therms between 2012 and 2020, the largest contributor to energy reductions over this period (University of San Diego [USD] Energy Policy Initiative Center [EPIC] 2009).

A 2009 study intended to determine the remaining potential for energy efficiency programs in California included a detailed, bottom-up study of energy efficiency program potential in San Diego County (USD EPIC 2009). The primary objective of the work underlying this report was to produce estimates of remaining potential energy savings that might be obtainable in the near (2007-2016) and foreseeable (2017-2026) future through publicly funded energy efficiency programs in the existing and new residential, industrial, and commercial sectors. The purpose of the study was to identify energy savings potential in the residential, commercial, and industrial sectors both for new construction and existing buildings. The study focused on providing a reasonable proxy of the remaining potential for implementation of local government policies to affect energy savings.

Study results show that the residential sector has the highest remaining potential for energy program reductions, representing 49 percent of the total potential, followed by the commercial (34 percent) and industrial (17 percent) sectors. Existing buildings represent 89 percent of the energy reduction estimate, while new construction represents 11 percent.

The existing residential sector represents about 48 percent of the entire efficiency potential identified in the analysis. Existing commercial buildings have the second highest potential for energy reduction at 24 percent of the total, and existing industrial buildings account for about 17 percent of the total.

Table 4.4-5, *Summary of Potential Energy Efficiency Through Local Policies*, *2020 Forecast, San Diego County*, details the anticipated remaining energy efficiency potentials for various land uses in San Diego County through the year 2020.

Table 4.4-5
SUMMARY OF POTENTIAL ENERGY EFFICIENCY THROUGH LOCAL POLICIES
2020 FORECAST, SAN DIEGO COUNTY

Sector	Natural Gas (MM Therms)	Natural Gas MMT CO_2e	Electric (gWh)	Electric MMT CO_2e	Total MMT CO_2e
Commercial - Existing	0.4	0.002	352	0.1	0.1
Commercial - New Construction	2.0	0.01	108	0.03	0.04
Industrial - Existing	10.2	0.06	69	0.02	0.1
Industrial - New Construction	N/A	N/A	2	0.001	0.001
Residential - Existing	12.0	0.1	505	0.1	0.2
Residential - New Construction	0.2	0.00	9	0.002	0.003
TOTAL	**24.8**	**0.13**	**1,045**	**0.28**	**0.41**

Notes: MM Therms = million therms; MMT CO_2e = million metric tons carbon dioxide equivalent; gWh = Gigawatt Hours; N/A = not available
Source: USD EPIC 2009

Project Site Energy Conditions

Energy for the regional shopping center is provided via purchased electricity for cooling, appliances, and plug-loads; and natural gas for cooking and water heating. The use of potable water at the project site requires the use of electrical energy to supply, distribute, and treat water and wastewater. Energy in the form of transportation fuels (i.e., diesel and gasoline) is used for deliveries, employees, and visitors of the shopping center.

Electrical Service

The project site is currently served by SDG&E. The SDG&E service area covers 4,100 square miles within San Diego and southern Orange counties. Energy is provided by SDG&E to 3.5 million customers through 1.4 million electric meters and 850,000 natural gas meters (SDG&E 2012). Forecasting future energy consumption demand is performed on a continual basis by SDG&E, primarily from installation of transmission and distribution lines. In situations

where projects with large power loads are planned, this is considered together with other loads in the project vicinity, and electrical substations are upgraded, if required.

SDG&E offers several programs to support local governments in implementing energy efficiency projects, including energy audits, a Tax Exempt Customer Incentive program, an On-Bill Financing program, a Small Business Super Saver program (includes cities and counties), an Express Efficiency program, and a Standard Performance Contract program. SDG&E works with local governments and non-profit organizations to promote energy efficiency, demand response and conservation programs, services and resources, and to provide energy education and outreach to the community.

Natural Gas

The existing shopping center uses natural gas purchased from SDG&E, primarily for cooking and water heating. Based on the South Coast Air Quality Management District (SCAQMD) estimated usage of 2.9 cubic feet (cf) of natural gas per square foot per month (cf/square foot) for commercial use and the existing 1,151,092 square feet of GLA, the existing natural gas demand is estimated at 3,338,190 cf/month, or 40,058,280 cf/year.

Water Service

Water service is provided to the site by the Carlsbad Municipal Water District (CMWD), a subsidiary district of the City of Carlsbad. The CMWD currently imports all of its potable water supply, as there are no local sources of drinking water (CMWD 2011). The two main sources of water are from the Colorado River and northern California, via the State Water Project (SWP). Water from these sources is imported and treated by the Metropolitan Water District of Southern California (MWD) and the San Diego County Water Authority (SDCWA). The SDCWA is a wholesale water agency providing imported water to its 23 member agencies in San Diego County. CMWD water is supplied from the SDCWA's Second Aqueduct, which provides treated water to four of the CMWD's pressure zones. The project is directly served by the 255 Pressure Zone, the lowest of the CMWD's 17 pressure zones.

Utilizing the unit demands for non-residential development provided in the CMWD 2003 *Water Master Plan Update*, the average day, maximum day, and peak hour potable water demands were calculated based on the existing building area square footage (1,151,092 square feet of gross leasable area [GLA]). For the existing shopping center, average day demands were determined to be 183.8 gpm (or 264,751 gallons per day), based on the non-residential water use

rate of 2,300 gallons per day per 10,000 square feet of building area. Maximum day and peak hour demands are the average day demands multiplied by the peak factors of 1.65 and 2.9, respectively. Maximum day demand is estimated at 303.27 gpm and peak hour demand is estimated at 533.02 gpm.

The provision of potable water to commercial consumers requires large amounts of energy associated with five stages: (1) source and conveyance, (2) treatment, (3) distribution, (4) end use and (5) wastewater treatment. Therefore, there is a certain amount of energy use in every unit of water utilized by a project. This is known as the embedded energy for various water uses. The CEC established a benchmark for evaluating the relative values of proxy energy use values per water use, estimating the amount of energy needed for each segment of the water use cycle in terms of the number of kWh needed to collect, extract, convey, treat, and distribute one million gallons (MG) of water, and the number of kWh needed to treat and dispose of the same quantity of wastewater.

Table 4.4-6, *CEC-recommended Water Energy Proxies for Southern California*, shows the CEC's recommended water-energy proxies based on the water-use cycles for indoor and outdoor uses (CEC 2006a).

Table 4.4-6
CEC-RECOMMENDED WATER ENERGY PROXIES FOR SOUTHERN CALIFORNIA

Water-Use Cycle	Indoor Uses kWh/MG	Outdoor Uses kWh/MG
Water Supply and Conveyance	9,727	9,727
Water Treatment	111	111
Water Distribution	1,272	1,272
Wastewater Treatment	1,911	0
Regional Total	**13,021**	**11,110**

Source: CEC 2006a
kWh = kilowatt hours; MG = million gallons

Based on the existing average daily water demand of 264,751 gallons per day, the existing shopping center requires approximately 94,251,000 gallons per year of water. Applying the typical embedded energy factor given by the CEC for indoor use (13,021 kWh per million gallons), water-related energy demand at the existing shopping center is estimated at 1,227,424 kWh/year, or 1,227 megawatt-hours (MWh)/year.

Wastewater Service

The City of Carlsbad is divided into 25 local facility management zones (LFMZ) and each of these zones is divided into drainage sub-basins based on the gravity flow of wastewater. The project is located in drainage sub-basin 1A, which drains to the Vista/Carlsbad Interceptor. Flows through this interceptor are ultimately conveyed to the Encina Wastewater Authority's Encina Water Pollution Control Facility (Encina WPCF) for treatment.

Utilizing the non-residential generation rates provided in the *City of Carlsbad Sewer Master Plan Update March 2003*, average dry weather and peak wet weather flow rates were calculated for the existing shopping center based on the building area square footage (1,151,092 square feet GLA). The average dry weather flow rate was determined to be 88.6 gpm (or 0.127 million gallons per day), based on the non-residential generation rate of 1,150 gallons per day per 10,000 square feet of building area. Peak wet weather flow was estimated to be 2.9 times the average dry weather flow for the Vista/Carlsbad Interceptor, which would be 256.9 gpm (or 0.370 million gallons per day) for the existing shopping center.

Energy demand related to wastewater treatment is accounted for in the CEC's recommended water-energy proxies based on the water-use cycles for indoor and outdoor uses, as described above (CEC 2006a).

Transportation

Energy is also used for transportation, in the form of fuel for vehicular trips. Traffic to and from the shopping center generally includes visitors, employees, and deliveries traveling via passenger cars, light-duty trucks, and/or transit/public transportation.

Regulatory Framework

Federal Energy Efficiency Regulations

Corporate Average Fuel Economy Standards

The federal Corporate Average Fuel Economy (CAFE) standard determines the fuel efficiency of certain vehicle classes in the United States. In 2007, as part of the Energy and Security Act of 2007, CAFE standards were increased for new light-duty vehicles to 35 miles per gallon (mpg) by 2020. In May 2009, President Obama announced plans to increase CAFE standards to require

light duty vehicles to meet an average fuel economy of 35.5 mpg by 2016. Additional discussion of the CAFE standards is provided in Section 4.6 of this report.

Energy Independence and Security Act of 2007

House of Representatives Bill 6 (HR 6), the federal Energy Independence and Security Act of 2007, established new standards for a few equipment types not already subjected to a standard, and updated some existing standards. Perhaps the most substantial new standard that HR 6 established is for general service lighting that will be deployed in two phases. First, by 2012 to 2014 (phasing in over several years), common light bulbs will be required to use about 20 to 30 percent less energy than present incandescent bulbs. Second, by 2020, light bulbs must consume 60 percent less energy than today's bulbs; this requirement will effectively phase out the incandescent light bulb.

Energy Improvement and Extension Act of 2008

The formerly entitled "Renewable Energy and Job Creation Act of 2008," or Division B of HR 1424, was signed into law by President Bush in October 2008. The signed bill contains $18 billion in incentives for clean and renewable energy technologies, as well as for energy efficiency improvements.

California Energy Efficiency Regulations

In addition to the State regulations presented in Section 4.6, *Greenhouse Gas Emissions* (i.e., AB 32; SB 97; SB 375; SBs 1078, 107, and 2; SB 1368; and the CARB Scoping Plan), State energy efficiency regulations that have the potential to substantially impact the proposed project are discussed below.

Assembly Bill 1007

This 2005 bill required the CEC to prepare, jointly with the CARB, a plan to increase the production and use of alternative and renewable fuels in California based on a full fuel-cycle assessment of the environmental and health impacts of each fuel option. The *State Alternative Fuels Plan* was adopted by the two agencies in December 2007. The plan highlights the need for state government incentive investments of more than 100 million dollars per year for 15 years and recommends that the state adopt alternative and renewable fuel use goals of 9 percent by 2012, 11 percent by 2017, and 26 percent by 2022.

Assembly Bill 1969

This 2006 bill authorized feed-in tariffs for small renewable generators of less than one MW at public water and wastewater treatment facilities. A feed-in tariff is a policy mechanism designed to encourage the adoption of renewable energy sources and to help accelerate the move toward grid parity, the point at which alternative means of generating electricity are equal in cost, or cheaper than grid power. In July 2007, the CPUC (D. 07-07-027) implemented AB 1969, expanded the feed-in tariffs to 1.5 MW, and included non-water customers in the PG&E and SCE territories. The power sold to the utilities under feed-in tariffs can be applied toward the state's renewable portfolio standard (RPS) targets. Senate Bill (SB) 380 (2008) codified the CPUC expanded feed-in tariff to include all RPS-eligible generators 1.5 MW and below. The program cap was also expanded from 250 MW to 500 MW. As of August 2009, 14.5 MW of contracted capacity had resulted from the tariff.

Assembly Bill 2021

This 2006 bill requires the CEC, in consultation with the CPUC and publicly owned utilities, to develop a statewide estimate of all potentially achievable cost-effective electricity and natural gas efficiency savings and establish statewide annual targets for energy efficiency savings and demand reduction over 10 years.

Assembly Bill 118 and Assembly Bill 109

This 2007 bill created the Alternative and Renewable Fuel and Vehicle Technology Program. The statute, subsequently amended by AB 109 (2008), authorizes the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. The CEC has an annual program budget of approximately 100 million dollars and is required to adopt and update annually an investment plan that determines the funding priorities.

Assembly Bill 1613

Also known as the Waste Heat and Carbon Emissions Reduction Act, this 2007 bill was designed to encourage the development of new Combined Heat and Power systems in California with a generating capacity of up to 20 MW, resulting in more efficient use of natural gas and reduced GHG emissions. The bill requires the CPUC and the CEC to establish policies and procedures for the purchase of electricity from eligible systems.

Assembly Bill 758

This 2009 bill requires the CEC to establish a regulatory proceeding by March 1, 2010, to develop a comprehensive program to achieve greater energy savings in existing residential and non-residential buildings.

Assembly Bill 811

AB 811 is a property tax bill that gives all California cities and counties the ability to offer low-interest loans for energy-efficiency projects and solar panels to homeowners and small businesses.

California Code of Regulations, Title 24, Part 6: California Energy Code

California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24; Energy Code) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Title 24 has been updated as of 2008 and standards were phased in as of January 2010. The latest Title 24 standards are anticipated to increase energy efficiency by 15 percent. Energy-efficient buildings require less electricity, natural gas, and other fuels.

California's Electricity Loading Order

The loading order, adopted by the CEC in 2003, calls for California's electricity needs to be met with (1) increased energy efficiency and demand response; (2) new generation from renewable energy and distributed generation resources; and (3) clean fossil-fueled generation and infrastructure improvements.

CEC Tier II Energy Efficiency Goals

Under state law, the CEC is required to establish eligibility criteria, conditions for incentives, and rating standards to qualify for ratepayer-funded solar energy system incentives in California. As part of this effort, the CEC establishes energy efficiency standards for homes and commercial structures, and requires new buildings to exceed current building standards by meeting Tier Energy Efficiency goals. CEC Tier II Energy Efficiency goals will continue to be updated to

achieve energy efficiency best practices, and are consistent with what is needed to meet the CPUC Strategic Plan goals of zero net-energy buildings. Currently, CEC proposed guidelines for the solar energy incentive program recommend a Tier II goal for residential and commercial projects of a 30 percent reduction in building combined space heating, cooling, and water-heating energy, compared to the 2008 Title 24 Standards.

2010 California Green Building Standards Code

The 2010 California Green Building Standards Code, referred to as CALGreen, went into effect in January 2011. CALGreen is the first-in-the-nation statewide mandatory green building code. California now requires new buildings to reduce its water consumption, employ building commissioning to increase building system efficiencies, divert construction waste from landfills, and to install low pollutant-emitting finish materials. CALGreen has approximately 52 mandatory measures and additional measures designed to allow local cities to adopt codes that go beyond the state mandatory provisions. Some key mandatory measures for commercial buildings include specified parking for clean air vehicles, a 20 percent reduction of potable water use within buildings, a 50 percent construction waste diversion from landfills, use of building finish materials that emit low volatile organic compounds, and building commissioning. Other key components include increased reduction in energy usage by 15 percent and increased reduction in potable water use. The CALGreen code includes the critical issue of compliance verification by utilizing the existing building code enforcement infrastructure, and allows local public agencies to incorporate the CALGreen code provisions into their construction field inspections. The mandatory CALGreen measures will be inspected and verified by local building departments.

Executive Order D-16-00

This EO signed by Governor Gray Davis on August 2, 2000, established a state sustainable building goal. The sustainable building goal is to site, design, deconstruct, construct, renovate, operate, and maintain state buildings that are models of energy, water, and materials efficiency; while providing healthy, productive, and comfortable indoor environments and long-term benefits to Californians. As with the Energy Code, reductions in energy usage provided by sustainable building design would result in reduced GHG emissions.

Executive Order S-06-06

This 2006 EO established a biomass target of 20 percent within the established RPS goals for 2010 and 2020 and charged the CEC, along with other commissions and departments, to identify and secure funding for research and development projects to advance the use of biofuels for transportation.

Executive Order S-01-07

Former California Governor Arnold Schwarzenegger signed this 2007 EO setting a statewide goal of reducing "the carbon intensity of California's transportation fuels by at least 10 percent by 2020." The EO directs the secretary for the California EPA (Cal/EPA) to coordinate the actions of the CEC, the CARB, the University of California, and other agencies to assess the "life-cycle carbon intensity" of transportation fuels. Pursuant to this EO, CARB completed its review of the Low Carbon Fuel Standard (LCFS) protocols and adopted them as a discrete early action under AB 32 in October 2007. In April 2010, the regulation was formally adopted. On December 29, 2011, District Judge Lawrence O'Neill in the Eastern District of California issued a preliminary injunction blocking CARB from implementing LCFS. The court found that LCFS impermissibly discriminates against out-of-state corn ethanol and impermissibly regulates beyond California in violation of the dormant Commerce Clause doctrine. As a result of this injunction, LCFS were not incorporated into the analysis provided in this EIR.

Executive Orders S-14-08 and S-21-09

Governor Arnold Schwarzenegger signed EO S-14-08 in November 2008, directing the CARB to adopt regulations increasing California's RPS from 20 percent to 33 percent by 2020. On September 15, 2009, Governor Schwarzenegger signed EO S-21-09, requiring that the CARB, under its AB 32 authority, adopt a regulation consistent with the 33 percent renewable energy target established in EO S-14-08 by July 31, 2010. The order requires that the CARB establish the highest priority for those resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health that can be developed most quickly and that support reliable, efficient, cost-effective electricity system operations including resources and facilities located throughout the Western Interconnection. The Western Interconnection is one of the two major alternating current power grids in North America, stretching from western Canada on the north to Baja California, Mexico on the south, and from the Pacific Ocean on the west, to the east over the Rocky Mountains to the Great Plains.

Senate Bill 1

This 2006 bill enacted Governor Schwarzenegger's Million Solar Roofs program with the overall goal of installing 3,000 MW of solar photovoltaic systems.

Senate Bill 17

This 2009 bill requires the CPUC (in consultation with the CEC, the California Independent System Operator Corporation [ISO], and other key stakeholders) to determine the requirements for a smart grid deployment plan consistent with the policies set forth in the bill and federal law by July 1, 2010. The bill requires the smart grid to improve overall efficiency, reliability, and cost-effectiveness of electrical system operations, planning, and maintenance. Each electrical corporation must develop and submit a smart grid deployment plan to the CPUC for approval by July 1, 2011.

Senate Bill 32

This 2009 bill requires each local publicly owned electric utility with 75,000 or more retail customers to offer a feed-in tariff for eligible renewable energy facilities up to 3 MW in size until the utility meets its proportionate share of a total statewide cumulative cap of 750 MW. The feed-in tariff price is to reflect the value of every kWh of electricity generated based on the time of delivery. The price may be adjusted based on other attributes of renewable generation. SB 32 also requires IOUs to expand their current feed-in tariffs for eligible renewable energy facilities from 1.5 MW to 3 MW until the utility meets its proportionate share of a total statewide cumulative cap of 750 MW. Prior to this bill, the statewide cap was 500 MW. The feed-in tariff shall provide performance guarantees for any generator greater that one MW.

State CEQA Guidelines – Appendix F

Section 15126.4 (a)(1) of the State CEQA Guidelines states that an EIR shall describe feasible measures which could minimize significant adverse impacts, including, where relevant, inefficient and unnecessary consumption of energy.

State CEQA Guidelines Appendix F, Energy Conservation, provides guidance for EIRs regarding potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing the inefficient, wasteful, and unnecessary consumption of energy. In addition, though

not described as thresholds for determining the significance of impacts, Appendix F seeks inclusion of information in the EIR addressing the following impacts:

- The project's energy requirements and its energy-use efficiencies by amount and fuel type for each stage of the project, including construction, operation, maintenance, and/or removal. If appropriate, the energy intensiveness of materials may be discussed.
- The effects of the project on local and regional energy supplies and on requirements for additional capacity.
- The effects of the project on peak and base period demands for electricity and other forms of energy.
- The degree to which the project complies with existing energy standards.
- The effects of the project on energy resources.
- The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

California Air Resources Board: Interim Significance Thresholds

In October 2008, the CARB released interim guidance on significance thresholds for GHG emissions for industrial, commercial, and residential projects. The draft proposal for residential and commercial projects states that a project would not be significant if it complies with a previously approved plan that addresses GHG emissions, or meets an energy use performance standard defined as CEC's Tier II Energy Efficiency goal (specified as 35 percent above Title 24 requirements) along with "as yet to be defined" performance standards for water, waste, and transportation or is below an "as yet to be developed" threshold for GHG emissions tons per year. As such, CARB did not establish a threshold of significance.

Regional Policies and Regulations

SANDAG: Climate Action Strategy

The SANDAG Climate Action Strategy serves as a guide to help policymakers address climate change as they make decisions to meet the needs of the growing population, maintain and enhance quality of life, and promote economic stability (SANDAG 2010). The purpose of the strategy is to identify land use, transportation, and other related policy measures that could reduce GHG emissions from passenger cars and light-duty trucks as part of the development of the Sustainable Communities Strategy for the 2050 Regional Transportation Plan in compliance with SB 375. Other policy measures are also identified for buildings and energy use, protecting transportation and energy infrastructure from climate impacts, and to help SANDAG and other local agencies reduce GHG from their operations.

SANDAG 2009 San Diego Regional Energy Strategy

The RES is an important and integral part of the larger San Diego Regional Comprehensive Plan, intended to contain an integrated set of public policies, strategies and action plans to promote a smarter, more sustainable growth for the San Diego region. The following goals set forth by the RES are relevant to the proposed project:

1. Renewable Energy
   GOAL: Support the development of renewable energy resources to meet or exceed a 33 percent renewable portfolio standard (RPS) by 2020 and a 45 percent RPS by 2030.

2. Distributed Generation
   GOAL: Increase the total amount of clean distributed generation (renewable and non-renewable) to reduce peak demand and diversify electricity resources in the San Diego region.

3. Energy and Water
   GOAL: Reduce water-related energy use.

4. Peak Demand
   GOAL: Implement cost-effective steps and incentives to utilize demand response and energy efficiency measures to reduce peak demand.

5. Transportation Fuels
   GOAL: Substantially increase the deployment of alternative transportation fuels and vehicles.

Local Policies and Regulations

City of Carlsbad General Plan Open Space and Conservation Element

The Open Space and Conservation Element of the General Plan discusses a citywide open space plan in which energy use is addressed in terms of air quality and public health and safety. It states that although it is not believed that the orientation or pattern of the open space system in Carlsbad can measurably impact air quality, there are some general ways in which open space may result in positive reductions in air pollutant levels (and therefore related energy use):

- Trees and other vegetation absorb carbon dioxide and remove particulate matter from the atmosphere. Properly sited trees around homes can provide shade and lower temperatures within the urban area so that energy, and thus pollutant emissions, can be reduced.

- Open space greenways which accommodate trails for pedestrian and particularly bicycle use can encourage residents to use non-vehicular modes of circulation, thereby reducing emissions related to fossil-fuel-burning engines. The more enjoyable the trail use experience, the more people are likely to choose to use this alternative means of getting around their community. Connections to mass transit hubs such as the future commuter rail stations, and park and ride facilities may be especially valuable in this regard.

The Open Space and Conservation Element does not contain specific Goals, Objectives, or Policies related to energy (City 1994b).

4.4.2 Thresholds for Determining Significance

The State CEQA Guidelines Appendix G does not contain specific thresholds to identify when a significant energy-use impact would occur. State CEQA Guidelines Appendix F, Energy Conservation, provides direction as to the type of information, analysis, and mitigation that should be considered in evaluating a proposed project, but does not provide specific energy conservation thresholds.

Other guidance on the content and standards for EIR energy evaluations has come from recent case law. On August 27, 2009, the California Court of Appeal, Third Appellate District issued the first ever CEQA decision on the requirements of an energy conservation impacts analysis in the case of *Tracy First v. City of Tracy (2009) 177 Cal. App. 4th 912.* The court ruled it was appropriate for the EIR to rely upon the CBC Energy Efficiency Standards, which are part of the State's Title 24 Building Code, to determine that the project's energy impacts would be less than significant. The Court also held that CEQA does not require that an EIR discuss "every possible energy impact or conservation measure" listed in Appendix F of the State CEQA Guidelines.

In accordance with Appendix F of the State CEQA Guidelines and recent case law, and for the purposes of this EIR, the proposed project would result in a significant impact to energy conservation if it would:

- Cause wasteful, inefficient, and unnecessary consumption of energy during project construction, operation, and/or maintenance; and/or

- Conflict with the CBC Energy Efficiency Standards, the *2009 San Diego Regional Energy Strategy* renewable energy goals, City of Carlsbad General Plan policies, the CARB passenger vehicle GHG emission reduction targets for 2020 and 2035, or any other applicable energy conservation regulations.

4.4.3 Environmental Impact

Per Appendix F of the State CEQA Guidelines, energy conservation impacts were analyzed by estimating project energy requirements by amount and fuel type, along with project compliance with regulatory requirements. These data were used to evaluate the project's effects on energy resources and the degree to which the project complies with existing energy standards.

Construction Impacts

Project construction would require the use of a variety of construction equipment for demolition, grading, hauling, renovation, and building activities. The primary energy demand during construction would be associated with the use of gasoline- and diesel-powered mobile construction equipment and the use of automobiles to transport workers to and from the project site. Construction equipment would require the use of gasoline, oil, and other possible fuel sources to operate. This increased fuel consumption would be temporary, and would not have a residual requirement for additional energy input. The marginal increases in fossil fuel use resulting from project construction are not expected to have an appreciable impact on energy resources.

Energy Consumption

Grading of the site would be minimal, which would reduce energy use, costs, and land disruption due to construction. No excavation would be required. Because the proposed project is in the planning stages and detailed construction information, such as the number of equipment, materials, and labor hours, is not available, detailed quantitative assessment of construction energy impact is not possible. Instead, an estimate of the energy that would be consumed for construction proposed under the project alternatives has been made by applying the estimated construction data used in the CalEEMod model (see Section 4.2, *Air Quality*, for details). Construction energy is calculated based on the fuel consumption rates from the SCAQMD CEQA Air Quality Handbook for each off-road heavy-duty equipment and on-road vehicle (SCAQMD 1993). Fuel economy (i.e., gasoline and diesel) for all off-road equipment and on-road vehicles was also determined using values provided in the CARB's OFFROAD2007 and EMFAC2007 models. This analysis does not assume increases in fleet fuel economy due to changes in technology, as the data on the average fuel economy of the equipment remain unavailable at time of analysis. This analysis accounts for the maximum duration of construction activity estimated for the project. Table 4.4-7, *Estimated Energy Consumption from Construction Equipment and Vehicles*, presents the amount of energy in BTUs required for the

construction of the proposed project. The total estimated amount of energy consumption required to build the project is approximately 31.6 billion BTUs.

Table 4.4-7
ESTIMATED ENERGY CONSUMPTION
FROM CONSTRUCTION EQUIPMENT AND VEHICLES

Construction Phase	Maximum Daily BTUs (BTU/Day)	Maximum Construction Duration BTUs (BTU/period)
Demolition	99,003,606	1,980,072,125
Grading	71,255,559	1,425,111,851
Building Construction	53,545,702	16,545,622,017
Architectural Coating	11,201,087	1,792,173,926
Paving	239,130,218	9,852,164,978
Total One-time Energy Expenditure		**31,595,144,224**

Construction of the project would incorporate on-site energy conservation and demand-side management features, including limiting trucks and construction equipment idle times to reduce fuel consumption and pollutant emissions. The following practices would be implemented during the project construction to reduce waste and energy consumption:

- Development of a construction waste management plan;
- Establish and maintain a recycling program through the waste management company for construction debris;
- Commitment to recycle or reuse at least 50 percent of demolition and construction waste;
- Use of non-toxic cleaning supplies bottled in recycled or recyclable containers;
- Implement a recycling program in the office trailer for paper, newspaper, cardboard, aluminum cans, glass, etc.;
- Utilize permanent power for the office trailer as long as possible in lieu of running a less efficient generator;
- Use rechargeable batteries where practicable;
- Use on-site electricity to power equipment, where feasible;
- Follow maintenance schedules to maintain equipment in optimal working order and rated energy efficiency, which include, but not be limited to, regular replacement of filters, cleaning of compressor coils, burner tune-ups, lubrication of pumps and motors, proper vehicle maintenance, etc.;

- Review construction and demolition materials to identify which may be reused or recycled on site;
- Reduce on-site vehicle idling; and
- Recycle waste and solvents, and use biodegradable lubricants and hydraulic fluids.

Upon implementation of these practices, the project's construction-phase impacts related to unnecessary consumption of energy would be less than significant.

CBC and Regulatory Compliance

The proposed project, like all projects within the City, would be required to comply with CBC Energy Efficiency Standards, in addition to all other city, state, and federal energy conservation measures during the construction phase. Therefore, the proposed project construction would not conflict with the CBC, and no impact would occur.

In summary, construction of the project would incorporate on-site energy conservation and demand-side management features as described above, including the limiting of trucks and construction equipment idle times to reduce fuel consumption and transportation energy demand. Project construction would be required to comply with all applicable local, state, and federal regulatory requirements regarding energy conservation. Therefore, construction impacts related to energy conservation would be less than significant.

Operational Impacts

The proposed project involves the reconfiguration, and/or reconstruction of the interior of the existing Robinsons-May building and other existing retail areas at the Westfield Carlsbad Shopping Center, conversion of 225,631 square feet (sf) of these spaces for new commercial uses, and the development of up to approximately 35,417 sf of net new GLA. The conversion of retail space and introduction of new GLA would result in continued use of energy resources on site, as discussed below.

Energy Consumption

Approval of the proposed SDP would result in a net increase in retail space of approximately 35,417 square feet over the existing conditions, or approximately three percent. Therefore, analysis of project energy consumption is conducted based on the increase in GLA of the proposed SDP, or an approximately three percent increase over the existing energy demand for

the shopping center. However, a net reduction in energy consumption would be realized at the Westfield Carlsbad shopping center as a whole since 225,631 sf of existing shopping center space would be renovated and reconstructed using 2008 Title 24 and CALGreen building code standards.

Electric Energy

Based on the information contained in the CalEEMod model (see Appendix G), the increase in electrical energy demand related to the proposed project is estimated at 497,255 kWh/yr.

Natural Gas

The proposed project's natural gas usage was calculated based on the CEC estimated usage of 2,290 BTU / for commercial use. Utilizing this projection and an estimated net increase of 35,417 sf of additional GLA combined with the reduction in natural gas usage associated with the 225,631 sf renovation, the SDP's net estimated natural gas demand is estimated at 81,104 kBTU /year.

Water (including Wastewater)

According to the Water Study for the Project, water demand for the proposed project would increase by approximately 5.66 gallons per minute, or 8,145 gallons per day (see Section 4.13, *Utilities and Service Systems*), which translates to 2,972,925 gallons per year, or 2.97 million gallons per year of water. Applying the typical embedded energy factor given by the CEC for indoor use (13,021 kWh per million gallons), water-related energy demand at the existing shopping center is estimated at 38,698 kWh/year, or 38.7 megawatt-hours (MWh)/year.

The current SDP proposal would not require construction of additional sewer infrastructure or wastewater treatment facilities. With the addition of 35,417 net new square feet GLA, the current proposal would generate a maximum future demand of approximately 4,072 gpd of wastewater (Dexter-Wilson 2010).
Energy demand related to wastewater treatment is accounted for in the CEC's recommended water-energy proxies based on the water-use cycles for indoor and outdoor uses, as described above (CEC 2006a).

Transportation

Energy is used for transportation, in the form of fuel for vehicular trips. At project buildout, a maximum increase of approximately 1,240 ADT is projected for the proposed SDP.

Vehicle travel at speeds other than the most fuel-efficient speed can lead to dramatic increases in fuel consumption. Although a precise relation for the entire fleet of vehicles is not known, the effect of a reduction of average speed in the region can be estimated. Based on the information from the CARB's most recent version of its Mobile Source Emission Inventory and Emission Factors model (EMFAC 2007), vehicle speeds from approximately 30 mph to approximately 35 mph would be operating at their full fuel economy potential. The estimated fuel economy associated with this speed range is 27.4 mpg for gasoline and 7.3 mpg for diesel. This analysis does not assume increases in vehicle fuel economy due to changes in technology, as the effects on the average fuel economy of the future years' vehicle fleet remain uncertain. With the estimated net increase of 1,240 ADT, the daily total number of vehicle miles traveled (VMT) for the proposed SDP was estimated in the CalEEMod model (refer to EIR Appendix G) to be approximately 146,178 miles per day. Based on the CARB EMFAC 2007 vehicle fleet types breakdown for San Diego County, approximately 84.7 percent of the VMT is gasoline-powered vehicles and approximately 15.3 percent is diesel-powered trucks. The energy consumption rates for gasoline- and diesel- powered vehicles are 4,562 and 19,015 BTU per VMT, respectively. Table 4.4-8*, Fuel Economy And Energy Consumption Rates For Autos And Trucks*, presents the fuel economy and energy consumption rates for the project-related automobile and trucks.

Table 4.4-8
FUEL ECONOMY AND ENERGY CONSUMPTION RATES FOR AUTOS AND TRUCKS

Vehicle Type	Fuel Economy (mpg)	VMT per day	Energy Consumption Factor (BTU/Vehicle Mile)	BTU per day
Passenger vehicles	27.4	130,390	4,562	594,846,396
Heavy trucks	7.3	22,014	19.015	418,595,572
			Total Daily BTUs	**1,013,441,968**

Source: Gibson 2012 and CARB EMFAC2007

As shown in Table 4.4-8, the estimated total annual energy consumption for direct energy usage from the project-related automobile and trucks (both gasoline and diesel combined) would be approximately 1.013 billion BTUs per day. Vehicles used and vehicle trips associated with the proposed SDP would be subject to state and federal regulatory requirements addressing fuel

efficiency, which would be expected to increase fuel efficiency over time as older, less fuel-efficient vehicles are retired. As discussed above under Regulatory Framework, the federal CAFE standards, EO S-1-07 LCFS, and AB 1493 fuel efficiency standard (analogous to the federal CAFE standard), as well as light/heavy vehicle efficiency/hybridization programs, all contribute to increased fuel efficiency, and therefore will reduce vehicle fuel energy consumption rates over time. As all vehicles would be subject to compliance with applicable local, state, and federal regulatory requirements regarding vehicle fuel efficiency, the project's vehicle–fuel related impacts to energy would be less than significant.

Energy Conservation

The CEC implements a number of programs designed to increase the efficiency of statewide energy utilization. With regard to electricity, the CEC has been actively funding local electricity efficiency-improvement and demand-side management programs, which have been and are expected to continue to be effective at reducing the rate of demand growth.

Actual future energy use is projected to be less than the estimated amounts for project buildout discussed above, due to energy conservation design features integrated into the proposed project, as presented in Section 3.4.2, *Site Development Plan*, of this EIR under the heading *Sustainable Design*.

As noted in Section 4.6, *Greenhouse Gas Emissions*, the project would exceed 2008 Title 24 Energy Efficiency Requirements and would comply with the 2010 CALGreen building standards. Like all projects within the City, the project would be required to comply with applicable city, state, and federal energy conservation measures during the operational phase. Other project impacts related to greenhouse gases are discussed in Section 4.6 of this EIR.

Natural gas, electricity, water, and vehicle fuel would be used for the operation of the regional shopping center. The project would utilize building materials and insulation in accordance with the CBC requirements, reducing the unnecessary loss of energy. As stated above, the project would include energy-conserving sustainable design features and energy efficiency measures. Development would not require the use of new sources of energy, and would not conflict with any adopted energy conservation plans.

In summary, upon compliance with required energy conservation measures and implementation of the proposed energy-related project design features, the project would reduce its energy demand in compliance with local, state, and federal regulations. The project would not conflict with any adopted energy conservation plans, and development would not require new sources of

energy. Therefore, operational impacts related to energy conservation would be less than significant.

4.4.4 Mitigation Measures

No mitigation measures are proposed as no significant impacts associated with energy have been identified.

4.4.5 Level of Significance after Mitigation

No mitigation is required; therefore, impacts would be less than significant.

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